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Applicant:	Mark W. Lehnert & Paul Podsobinski
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Title:	CONTROL SYSTEM FOR DISCONTINUOUS POWER DRIVE

DECLARATION UNDER 37 C.F.R. §1.132

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Sir:

I, Mark W. Lehnert, do hereby declare that:

(1) The 5,592,396 patent (hereinafter '396) uses airflow to map the fastening event using an apparatus similar to the present invention. However, the device of the '396 reference does not use the flow signature for control but rather as a trigger signal to start counting either the onset of a snug point or the proper starting point based on attaining a sufficient amplitude of pulses from an impact type power tool. In addition, in an impact wrench, the pulsed nature of the flow signal during the tightening of hammering, allows the blows, impacts to be easily counted for monitoring or control purposes. Further, the '396 patent discloses, determining whether the minimum and maximum rates of change of the fluid flow rate during tightening are within predetermined values and then, statistically processing the parameter computed during subsequent tightenings to identify trends or deviations from the normal conditions, and notifying an operator of such trends or deviations.

(2) The process for setting up the '396 system requires significant

operator input and decision-making or, in the alternative, a considerable amount of data collection is required for the computer to properly develop the limits through calculations. A series of "normal" tightenings, preferably at least 25, may be performed and the results recorded manually or transferred automatically to the computer 56 (or computer 52). By statistically evaluating these results in computer 56 (or computer 52), useful limits may then be set in computer 52. These limits may then be used for trapping (identifying) trends or deviations from learned normal conditions. This is a significant deviation both in process and in intent from the present invention. The present invention uses only one normal tightening cycle (LEARN Curve) to become fully set-up and functional.

(3) While the '396 patent describes the use of the device with direct drive (geared continuously driven) tools, the disclosure for controlling a pulse/impact type tool is for a control method that counts the number of pulses (once the amplitude level exceeds a predetermined level) to start counting and controlling the number the pulses and then calculating the area under each pulse to determine the total energy of the controlled number of pulses via a mathematically derived equivalent torque value. Means is provided for electrically processing the signal to count the number of blows delivered by the wrench. Means is provided to shut-off the fluid supply to the tool when a predetermined number of blows have been delivered, and means is provided for displaying the number of blows counted. Attempts at qualifying the event is claimed to be accomplished by mathematically comparing the summation of the total area represented by the pulses to preprogrammed high and low torque limits to determine acceptance based on the torque limits. Additionally, disclosure in the '396 patent is made that provides for trending and alarming the operator of trending based on the last two displayed fastening cycles.

(4) Extensive use of the flow signal gradient is disclosed in the '396 patent to determine such information as joint rate, joint configuration, lubrication and other varying conditions on which the system will report in an attempt to provide an indication of error detection. In the preferred embodiment of the '396 patent a

number of parameters are derived to help select the appropriate portion of the flow time curve over which to measure the flow gradient during the active phase of the tightening process. These levels are expressed as a percentage of the previously described mean speed level. The mean gradient is measured between the two points. This is a significant departure from the use of the flow/time relationship as employed in the present invention.

(5) The present invention is based on reaching equilibrium in the threaded fastener/joint/tool system at the desired torque level. The present invention is one of a prescribed process whereby the operator uses a closed loop control method including a rotary torque transducer to automatically teach (LEARN TgTq) the system the proper pressure setting for the individual tool being used through a gradual and controlled ramping of the air pressure while monitoring the applied torque to reach a condition of equilibrium in the tool/joint at the desired torque level. An actual run-down is then performed on the application (LEARN Curve) using the rotary torque transducer to determine the requisite run time required to attain equilibrium in the joint/tool system. This step is performed at the controlled pressure level as determined in the previous step and is controlled/determined by monitoring the signal from the transducer and stopping the airflow via a closed loop system. The actual control during the normal run cycle is by monitoring the flow drop off until it levels off (knee-over) and then timing the delivery of the controlled air pressure as predetermined in the Learn Curve step of the set-up routine to attain a condition of equilibrium in the system.

(6) The 5,689,434 patent (hereinafter '434) is essentially the same as 5,592,396 above. What is claimed is .means for counting fluid flow peaks corresponding to individual impacts of the wrench and, further comprises means for calculating the torque applied by the wrench during tightening by counting fluid flow peaks corresponding to individual impacts of the wrench. Again, the primary differences between our invention is one of not counting the blows or pulses for control nor does the present invention attempt to calculate and display the torque from the data collected during these pulses.

(7) The '396 and '434 patent references attempt to compensate for temperature changes and viscosity in the tool in an attempt to calculate and obtain a desired final torque value when the tool is running either in a "cold" condition or in a "hot" condition. The '396 and '434 patent references look at the energy delivered to the tool on the basis of a calculated area under the curve during "impacts" of the impact wrench. In contrast, the present invention does not provide any information regarding torque applied by the tool and in fact the "impacts" are filtered out of the signal in the present invention. The present invention is directed to process control, rather than torque control as disclosed in the '396 and/or '434 patent references. The '396 and 434 patent references attempt to correlate counting impacts and calculating area (energy) under the curve to the amount of torque applied to the fastener. Ultimately, this correlation proved impossible to accomplish in a commercial product, and no devices were ever commercially sold based on the '396 and/or '434 patents.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By: _____

Date: 3.08.05